of merely local interest, publish from time to time papers of more or less value, that it becomes a matter of considerable difficulty for the working naturalist to know what has been done upon any subject that may come before him. From this point of view the 'Year-Book of Scientific and Learned Societies,' of which the second issue is now before us, is a publication of considerable importance, and we can only hope that it may receive sufficient patronage to justify the publishers in continuing its production.

This second issue forms an octavo volume of 230 pages, and contains a list of societies, institutions, associations, clubs, and other similar bodies established for the cultivation of science, and including also some which hardly come under that denomination in the ordinary sense, being devoted to the study of agriculture and horticulture, law, literature and history, and medicine. By far the greater part of the bodies referred to, however, fall more or less strictly under the category of scientific societies, and of these we find detailed not only the titles and addresses, with generally the names of the presidents and other officers, but also complete lists of the papers read at their meetings during the year 1884, of the doings in which this second "year-book" is a record. The societies referred to in the volume are classified under fourteen heads, so as to bring together those which are established to perform similar functions, or to deal with the same or allied branches of knowledge, while the reference to any particular body is facilitated by the addition of a copious index arranged alphabetically.

PROCEEDINGS OF LEARNED SOCIETIES.

DUBLIN MICROSCOPICAL CLUB.

April 24, 1884.

Section of Schorliferous Quartz.—Prof. V. Ball showed a section of schorliferous quartz containing minute cells lined with a mineral dendritically arranged, possibly manganese.

Technitella legumen new to Irish Waters.—Prof. Haddon showed specimens of *Technitella legumen* (A. M. Norman) collected by Mr. Charles Elcock in the Irish Sea, near the Isle of Man; the first time it has been found in Irish waters.

Corynium Beijerinckii, a Fungus causing the "gumming" of Cherries.—Mr. Greenwood Pim showed *Corynium Beijerinckii*, a fungus said to be the cause of the gumming of cherries and other fruit-trees, other species producing "gum tragacanth" and similar products. The plant consists of a darkish, jointed, rather knotty mycelium, which produces 3–4-septate spores, broadly fusiform and somewhat constricted at the joints.

Gelatine Jelly simulating the "canal-system" of Eozoon canadense.—Prof. Sollas showed a thin slice of gelatine jelly containing groups of canals which curiously simulated in form, dimensions, and arrangement the canal-system of *Eozoon canadense*. They were obtained by slicing jelly frozen in Rutherford's microtome, and were no doubt caused by the crystallization of the water contained in the jelly into spicules of ice, which, afterwards thawing, left the canalicular spaces exhibited.

Parasitic Structure on Moss-leaves.—Mr. Archer showed leaves of a moss, which he owed to Mr. E. Parfitt of Exeter, bearing examples of what appeared to be either a form of adventitious bud or a true parasite growing on the edges and elsewhere from one of the leaf-cells. This growth formed a short, stout, cylindrical "filament," thick-walled and divided by four or five transverse septa, not obliquely sloped, as in protonematous growths. The cells, thus much shorter than broad, so formed were densely filled with coarse and scattered chlorophyll granules. Thus their growth presented at first glance a resemblance to some parasitic stigonematous algal form; but be it parasite or not, it certainly seemed that it could not be of that nature. It really seemed to be initiated by an outgrowth from one of the constituent cells of the leaf, and then the short stout filament, as described, formed by further transverse division; but its nature or purport remained a question.

Structure of Stem of Dracæna reflexa.—Prof. M'Nab showed a transverse section of the stem of *Dracæna reflexa*, showing circumferential growth by means of a meristem layer, which is to be regarded probably as the homologue of the interfascicular cambium of the dicotyledon, and that while the cambium of the dicotyledon gives rise to new wood, new bast, and new ground-tissue (medullary rays), the meristem gives rise in the tree Liliaceæ to the libero-ligneous bundles and ground-tissue.

May 15, 1884.

Peziza postuma from Potato-stalks.—Mr. Greenwood Pim showed *Peziza postuma* (Berk. et Wilson) growing from the sclerotia of potato-stalks, and which corresponded to the figures by Mr. Wilson in the 'Gardeners' Chronicle.' The whole plant *in situ* was exhibited, as well as a section under the microscope, showing sporidia &c. Mr. Pim had shown sections of the sclerotium to the Club a couple of years previously. The fully-developed *Peziza* from fruit was observed by Mr. Wilson in 1883. Mr. Pim's specimens were grown in damp Sphagnum in his greenhouse. He was indebted for the sclerotia to the kindness of Mr. Carroll, of the Model Farm, Glasnevin, who had received large quantities from various parts of Ireland, where last year it proved a formidable form of disease, quite distinct, of course, from the ordinary potato-murrain.

Section from Calf's Stomach.—Prof. Cunningham showed a section from a calf's stomach displaying the villi.

Presumed new Heliozoon discovered by Mr. Bolton near Birmingham.—Mr. Archer showed a sample from a gathering kindly forwarded to him by Mr. Bolton, of Birmingham, announced to contain a new and minute form of Heliozoon; but after a careful search through the material he had failed to find anything living, at all coming up to the expectation formed from Mr. Bolton's accompanying description. He had, however, met with, and now drew attention to, an organism which might, casually viewed, be regarded as a Heliozoon; but whatever might be the real nature of this, it could not be set down as appertaining to that group. This was globular, rather less than $\frac{1}{1000}$ inch in diameter, contents green, and rather thick-walled, and it was outwardly beset with numerous short, indistinct, subtruncate, subpellucid papillæ. Thus its radiate or stellate aspect lent this organism a certain amount of deceptive resemblance to a Heliozoon; but it could not be the organism referred to by Mr. Bolton, as it only distantly resembled his drawing. The gathering contained a quantity of *Euglenæ* passing into a vegetative condition by repeated self-division, and the conjecture presented itself, Might this globose papilliferous body represent an ultimate state of division of a *Euglena*, passed now into a globular thick-walled subspinulose resting form? But there was, further, in the gathering now and again to be detected an empty cell-wall, very thin, very hyaline, of a globular figure, and bearing a number of longish setæ or bristle-like hyaline spines, not unlike, only that these were notably more numerous, an empty skin of an example of the alga Mr. Archer had on a former occasion brought before the Club as *Oocystis setigera*. This too had the outline of a Heliozoon, but no sarcodic contents with green chlorophyll-bodies within, as depicted in the sketches, were present, and the longish bristle-like radii were clearly not pseudopodia, but rigid setæ. Here, then, was yet another object that might be taken at first glance for a Heliozoon, but it was obviously merely an empty cell-wall of great tenuity, not a globose sarcodic mass, however pellucid. It will be seen that it might be rather the evacuated cell-wall of some spore, to a certain extent of course calling to mind the zygospore of some Desmidian like *Staurastrum dejectum*, &c.; but it was, on the other hand, much more thin-walled and the radii were more slender and delicate than the empty cell-wall of such a zygospore, viewed under the same power, would appear to be. He had therefore missed what Mr. Bolton wished him to see; but it was nevertheless curious that, in so small an amount of material, two seemingly distinct things, superficially somewhat mutually alike, and both at the same time superficially like a minute Heliozoon, and both apparently novel in themselves, should occur. Mr. Archer really did know a minute Heliozoon, green, non-pulsating, with very slender pseudopodia, the green granules rather small and

somewhat densely filling up the mass—one to which he had never drawn attention, as its characteristics were found very difficult to determine; but it seemed certain that neither of the organisms here drawn attention to, nor, judging from Mr. Bolton's sketches, could his Heliozoon, be considered identical therewith.

Undescribed Epidermal Gland in Chiton.—Prof. Haddon exhibited transverse sections of *Chiton* (*Trachydermon*) *ruber* (Linn.), showing an undescribed epidermal gland at the posterior end of the animal on each side beyond the gills, which it is proposed to call the fenestral gland.

Development of Spicules in Geodia Barretti.—Prof. Sollas showed slices of *Geodia Barretti* in which the development of the globular spicules within a mother-cell could be traced through all the stages.

Cell-division in a problematic Chroococcaceous Alga.—Prof. M'Nab exhibited a slide of the Chroococcaceous alga from the wall of the stove at Glasnevin which contained the Desmids formerly exhibited. The material had been kept for about twelve months in a corked bottle, and the cells were dividing first into two and two, that is four cells placed linearly, and next into two transversely, so as to form two rows of four cells: all the cells remained in the gelatinous investment. The result of the division was the formation of eight very minute cells, whose further development was still under observation.

June 19, 1884.

Torrubia militaris new to Ireland.—Mr. Pim showed a section through the receptacle of *Torrubia militaris* which he had recently found growing (as is usual) from the body of a grub in Powerscourt demesne, near the Waterfall, being its first record, as far as he knew, in Ireland. The long and flexuous asci containing filiform sporidia are very striking.

Alcyonella fungosa exhibited.—Prof. Haddon exhibited *Alcyonella fungosa* in a living condition.

Archerina Boltoni, Lankester, *exhibited in a living condition.*—Mr. Archer presented for examination a group of four individuals of the new Sarcodine discovered by Mr. Bolton, of Birmingham, a specimen of which he had failed to find in the former gathering shown to the Club at last meeting. Here it was now "in the flesh," and a veritable novelty, which Prof. Lankester had done Mr. Archer and Mr. Bolton jointly the honour to designate, at least *pro tempore*, as *Archerina Boltoni*. As the group now under view showed, this is a more or less gregarious form, extremely minute

(say about $\frac{1}{1000}$ inch in diameter), orbicular, pellucid, containing one or two large chlorophyll-corpuscles, of elongate, somewhat kidney-shaped figure and smooth outline, and seemingly homogeneous texture, lying up against the periphery, thus leaving the centre more or less clear; the pseudopodia radiating in every direction, not very numerous, straight, very slender, long (say twice, thrice, or four times the diameter of the spherical body-mass), hyaline, clear; the outline of the body-mass sharp and smooth, not showing any pulsating vacuoles, nor allowing any nucleus to be detected. If a nucleus were present it might be supposed to be readily enough perceived in a body so clear as this, for even (now that we know that it is there) in the comparatively opaque and granuliferous body of *Actinophrys sol*, in certain examples, he thought it was not very difficult to detect the presence of the nucleus, even without dyeing. But the examples of this new form in the gathering were so few and far between, Mr. Archer had had no opportunity of experimenting to test the existence of a nucleus. No doubt the habit and appearance of this very minute form was that of a Heliozoon; but had it really no nucleus, what would it really be? Again, could it be possible that the very hyaline pellicular exuvium shown at last meeting has anything really after all to say to this organism? Could it be really possible that on becoming encysted it did not withdraw the pseudopodia, but became coated (body, pseudopodia, and all) in such a spinulose filmy envelope as that drawn attention to at the last meeting? If so, when the living protoplasmic substance withdraws therefrom, so as to leave behind the "spore-like" spinulose exuvium, the pseudopodia must pull themselves out of their minute tubular investments, and then escape (by a rent?) from the central globular portion. Is this pellucid integument composed of cellulose? All this would be very remarkable, and seems to indicate that this organism is at least most probably not a Heliozoon, much as it simulates one, but a Sarcodine of "lower" type. It is possible the great sharply-defined chlorophyll-masses might at some epoch become "zoospores" and perhaps "conjugate;" but this is only supposition. Mr. Archer learnt that Prof. Lankester was making a thorough examination with large material of this form, and it was to be hoped that he might be able to throw much light upon it. One thing at least was certain, that this was not the same green "Heliozoon" referred to by Mr. Archer at last meeting. At any rate, this is undoubtedly a new form; and Mr. Archer felt greatly indebted, so far as he was concerned, to Prof. Lankester for the honour done him in connecting his name with so interesting a novelty. He had also to thank Mr. Bolton very much for his courtesy and the pains he had taken to cause him at last to see the right thing.

A modified Microtome exhibited.—Dr. Scott exhibited a microtome devised by Dr. Hayes, Merrion Square, mainly on the model of the instrument by Junge of Heidelberg; but in place of the very great

delicacy which characterizes that instrument, this one was made rather roughly and strongly, rendering it more suitable for ordinary use. In place of a costly knife, of peculiar pattern, it worked with an ordinary razor, and was adapted for freezing tissues by means of ether. By a simple arrangement which Dr. Scott fitted to it, continuous series of sections of known thickness could be cut with ease. The price was also exceptionally low.

Chert with Sponge-spicules.—Prof. Sollas showed sections of chert from Lias with sponge-spicules.

Experiments to illustrate the Application of the Microscope to practical Mineralogical Questions, were shown by Prof. Tichborne. In examining an argentiferous mineral which was found in Wales, and known there as "blue stone," it became desirable to determine whether the said mineral was a definite double sulphide of lead and zinc, or whether it was a fine mechanical mixture of the two well-known minerals galena and blende. The said blue stone had been also found in Ireland at Ovoca, and being considered a definite mineral, had been christened Killmacooite, from a local name. Dr. Tichborne found that on gradually powdering the mineral and examining it from time to time under the microscope, a point was at length reached when half the particles became transparent and transmitted light, whilst no amount of powdering would render the other particles transparent. To try such an experiment it was necessary to view with very strong transmitted light (a half-inch object-glass) and to cut off all reflected light. From this experiment he came to the conclusion that the mineral was an intimate mixture of fine crystals of blende and galena, the blende being the transparent particles and the galena the opaque. Although both these minerals possess a certain degree of metallic lustre, galena is one of the most perfectly opaque substances known, whilst blende in very thin layers is perfectly transparent. Prof. Tichborne illustrated this by depositing thin layers of artificial galena and blende upon glass by the action of sulpho-urea upon alkaline solutions of the respective oxides of lead and zinc.

October 16, 1884.

Structure of Leaves of Abies subalpina, Engelm.—Prof. M'Nab exhibited sections of leaves of *Abies subalpina*, Engelmann, which he had collected in Kicking Horse Pass, Rocky Mountains, Sept. 12, 1884. These differed in no way from leaves of the type specimen of *Abies lasiocarpa*, Hooker, a species sent by Douglas from the very same region, and thus, according to the strict law of priority, Engelmann's recent name should be rejected.

Zygospore of Cosmarium cucurbita.—Mr. Archer showed the zygospore, or what appeared to be the zygospore, of *Cosmarium cucurbita*, collected by Mr. Pim at Killarney a few weeks previously. This formed a somewhat elongate, on the whole subelliptic figure,

the surface elevated into a number (say probably ten or twelve) of large hemispherical prominences; thus the whole presented a very broadly undulate outline. The cell-wall was thick, destitute of any processes beyond the somewhat tall rounded prominences, as mentioned. The chlorophyll-contents dense and remaining of a bright green. The identification of this pretty object as the zygospore of the species mentioned rested upon the presence of a pair of empty semicells, seemingly involved with it, and in just the position they ought to assume if they really were the halves of one of the parent-cells; of course this assumption would have been enormously fortified, if not indeed absolutely determined, had the empty semicells of another parent-cell been found in a corresponding position. At any rate, there could be but little doubt that this really was a spore; and if the assumption as to its identity be correct, this would seem to be the first record of the zygospore of that very common species. Indeed it is rather curious how *rarely* some of the *common* species of *Desmidieæ* are met with conjugated, though others, indeed, are frequently so encountered. The present zygospore has little resemblance to any other, and at least could not be mistaken seemingly for any described. Perhaps of all forms known it had most resemblance to that of *Penium phymatosporum*, a not uncommon species, of which, however, Mr. Archer had only once seen the zygospore; but, as might be expected from the relative size of the species, the present zygospore is far smaller, and, though seemingly elongate, is not subquadrate and compressed; it is, as mentioned, in general form elliptic, and might be described as broadly undulato-ovate. It has a certain resemblance, too, to the zygospore of one at least of three common forms, confused under the name *Cosmarium margaritiferum*, which, however, is greatly larger, spherical, and its hemispherical prominences, in proportion to the bulk of the total mass of the zygospore, not nearly so elevated.

Gelatinous Alga from a Geyser-basin, Yellowstone Park, Wyoming.—Mr. G. F. Fitzgerald exhibited some morsels of a gelatinous growth which he had found in the "Prismatic Pool" in the middle of a Geyser-basin, Yellowstone Park, Wyoming, United States. The mass from which he had taken the specimens grew to a distance of about 5 or 6 feet nearly all round the edge of the pool, which was about 30 yards in diameter. The water of the pool overflowed its edge almost throughout, and it was in this overflow water that the jelly-like substance grew. The temperature of the water was from 100° to 120° Fahr. It grew on what appeared to be a flat tuffa rock, deposited out of the water of the pool, and covered it very uniformly to a depth of about an inch to an inch and a half. Its upper surface was somewhat lumpy, very much like the thick moss that grows in cushions on the tops of walls, when the cushions get close enough to make a continuous surface. The upper surface was bright red, but below it was a nearly clear jelly of about the consistency

of a slimy stiff calf's-foot jelly. Under the top surface there were a series of what appeared like surfaces of growth that gave a vertical section somewhat the appearance of some agates.

November 20, 1884.

Canadian Specimen of Cosmarium notabile, Bréb.—Mr. Archer drew attention to specimens of *Cosmarium notabile*, Bréb., a rather small form, found in a Canadian gathering made by Prof. M'Nab on his recent visit. This is far from a common species here at home, but can hardly be called a rarity. It seems to be a constant form, though differing slightly in dimensions. Very few other forms occurred in the Canadian gathering, and none seemingly very noteworthy. A Palmellaceous algal form occurred in the gathering, of which Dr. M'Nab showed a slide. Some of the examples presented the appearance of a slipping out of the protoplasmic contents of certain of the cells *en masse*; some seemingly showing this phenomenon in a more remarkable manner Mr. Archer had met with in some of the material Dr. M'Nab had given him.

Nostoc calidarium, Wood, *from Geyser-basin, Wyoming*.—Dr. E. Perceval Wright showed a few mounted fragments of the gelatinous alga from the Geyser-basin, Yellowstone Park, Wyoming, which had been collected by Mr. G. F. Fitzgerald, and exhibited at the previous meeting of the Club. The mass seemed to be composed of a matting together of several algal forms, the prominent species in which was a *Nostoc*, very possibly *Nostoc calidarium*, Wood, a species described as found in a thermal spring in the northern portion of Owen's Valley, California, the temperature of the water being between 110° and 120° Fahr., or about the same as that of the water in which the specimens exhibited vegetated. Although the two sets of filaments referred to by Wood were present in the mass, no heterocysts had been detected. The other forms found were a *Chroococcus*, pretty generally diffused, and much more sparsely an *Oscillatoria*, provisionally *O. Fröhlichii*.

Aregma (*Phragmidium*) *obtusum*, Link, *exhibited*.—Mr. Greenwood Pim showed *Aregma* (*Phragmidium*) *obtusum*, Link, which occurred on leaves of the "Barren Strawberry" (*Potentilla fragariastrum*), in Hollybrook, near Bray, last autumn. This form is very distinct from those occurring on the bramble, rose, and raspberry, one of which was shown for comparison, in being quite obtuse at the apex of the spore and having a very short stalk. It appears rare, this being its first notice in Ireland, but occurring on a small and insignificant plant may probably often escape detection. It is curious that the three closely allied genera *Aregma*, *Xenodochus*, and *Triphragmium* are confined to members of the natural order Rosaceæ, whilst the extensive series of *Puccinias*, also nearly related, are found on various natural orders, Rosaceæ being almost exempt.

Myliusia Grayi.—Octahedral nodes of the skeleton, in comparison with those of *Dactylocalyx pumiceus* in the young state, were shown by Prof. Sollas.

Ctenodrilus, sp., a living example, was shown by Prof. Haddon.

December 18, 1884.

Plant-remains from Silurian Rocks.—Prof. Sollas showed a section from Silurian rocks presenting what seemed to be plant-remains, forming, in a longitudinal view, long drawn out, large, and thick-walled, variously sized non-septate tubes, and in a transverse view presenting each a circular outline, these involved in a common matrix.

Section of Quartz-trachyte, or Liparite, from the Neighbourhood of Smyrna, was shown by Prof. Hull, F.R.S. The district is well known to be rich in volcanic rocks of Tertiary age, consisting of trachytic, augitic, and other varieties of rock, together with tuffs and agglomerates, on a mass of which last the ancient castle is built.

The section exhibited is taken from a grey porphyritic rock, containing numerous crystals of sanidine, plagioclase, minute grains of quartz, crystals of biotite, augite, hornblende ?, sub-crystalline forms of vesuvian, and magnetite in small quantity in octahedral grains—in all about eight varieties of minerals set in a "ground-mass" (or paste) of glass.

The ground-mass requires a rather high power for observation, and is seen to consist of a glass traversed by multitudes of trichites and microliths, together with minute colourless prisms of apatite, quartz grains, and crystals of plagioclase. The quartz grains, both large and small, are also seen to contain numerous cavities, some with fluid, some containing "dust" or specks of magnetite (?),

From the above account it will be inferred that, with the polariscope, the section offers a very beautiful appearance, the various minerals displaying their coloration with ever varying effects as the polarizer is made to rotate.

On the whole it would appear that the rock answers pretty well to the description of "Liparite" of Roth, as given by Zirkel ('Mineralien und Gesteine,' p. 345) and Rosenbusch ('Mikroscopische Physiographie d. Mineralien,' Band ii. p. 138).

Remarkable Spore or Spore-like Body from the Carboniferous Formation.—Prof. Haddon exhibited a spore or spore-like body found in a section from the Carboniferous formation, Halifax, forming a very pretty object, much resembling some desmidian zygospore in its orbicular figure, beset all over by numerous short processes of equal length, causing the whole to present a stellate aspect.

Sphæroblasts from Stem of Privet (Ligustrum vulgare).—Dr. M'Nab exhibited a section of an arrested bud from the stem of

the privet (*Ligustrum vulgare*), the specimens of which were sent to him by Mr. Greenwood Pim. The arrested buds were numerous on the stem and were not arranged in any special order, so that there were probably both normal and adventitious buds, converted into sphæroblasts, like those so well known on the stem of the beech. Two peculiarities were noticeable: first, that the sides of the bud had four rows of leaf-scars, all internodes having been suppressed; and second, some of the arrested buds had produced opposite lateral buds, right and left, at their base, thus forming a three-lobed structure. The transverse section, shown under the microscope, exhibited a very remarkable contorted condition of the wood, with only slight traces externally of medullary rays. Both pith and cortex were well developed. The vessels were few and small, and the whole appearance was very different from that of normal privet-wood.

Photographs of Diatoms exhibited.—Prof. Haddon showed some fine photographs of Diatoms, from the War Museum, Washington, made under a very large amplification (2000–3000 diam.) of great beauty and clearness.

Prof. E. Perceval Wright showed examples and drawings of a new genus and species of *Alcyonaria* from the 'Challenger' collection.

Variety of "Grit" from Bray Head exhibited.—Prof. V. Ball, F.R.S., exhibited a section of a dense purple-coloured rock which is found near the southern extremity of the section of Cambrian rocks forming Bray Head. The mode of occurrence of this rock being for the most part obscure, although at one point it is distinctly stratified, this, together with its density and hardness, made it desirable to examine its microscopical characters. It proves to be a distinctly clastic rock, consisting mainly of small fragments of quartz in a ferruginous matrix. It may be regarded as a somewhat exceptional variety of the class of rocks of this age to which the term "grit" used to be applied by Prof. Jukes.

GEOLOGICAL SOCIETY.

April 15, 1885.—Prof. T. G. Bonney, D.Sc., LL.D., F.R.S., President, in the Chair.

The following communication was read:—

"Notes on the Polyzoa and Foraminifera of the Cambridge Greensand." By G. R. Vine, Esq. Communicated by Thomas Jesson, Esq., F.G.S.

After commenting on the want of published information concerning the Polyzoa of the Cambridge Greensand, as shown by the